

CLAIMS

1. An adjustable bed comprising:

a platform having a flexible surface;

a flex mechanism adapted to flex the platform to form

5 a flexion position that includes at least one of a sitting-up position and a knee break; and

a tilt mechanism adapted to tilt the platform surface laterally, wherein

the flex and tilt mechanisms are both operable with the
10 other mechanism in an operational state.

2. The adjustable bed of claim 1 comprising:

a side member disposed on at least one side of the platform; and

5 a side-member lift mechanism adapted to raise the side member relative to the platform surface, wherein

the tilt mechanism tilts the platform surface toward the side member raised by the side-member lift mechanism.

10 3. The adjustable bed of claim 1, wherein the flex mechanism forms the flexion position so that an upper leg of a bed user lying on the platform surface is tilted at an angle in a range of 10 degrees to 60 degrees inclusive at a time of the knee break.

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4. The adjustable bed of claim 3, wherein the flex mechanism forms the flexion position so that the upper leg is tilted at an angle in a range of 20 degrees to 40 degrees inclusive at a time of the knee break.

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5. The adjustable bed of claim 3, wherein the tilt mechanism is operable after the flexion position is formed by the flex mechanism.

6. The adjustable bed of claim 1 comprising:

a side member disposed on either side of the platform,
wherein

the tilt mechanism includes an elevation mechanism
5 adapted to elevate the pair of side members up and down, and

the platform surface is tilted and the side member at
a lower end thereof is raised relative to the platform surface,
by elevating at least one side of the platform surface using
the elevation mechanism.

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7. The adjustable bed of claim 6, wherein

the platform is supported from underneath by an
adjustable stage that oscillates on a fixed stage,

the adjustable bed comprises:

15 a load detection unit disposed between the fixed stage
and at least one of the side members; and

a tilt-mechanism control unit adapted to control a
driving of the tilt mechanism based on a detection signal
outputted from the load detection unit, and

20 the tilt-mechanism control unit maintains the driving
of the tilt mechanism in an OFF-state when the detection
signal received from the load detection unit shows that a
load of at least a predetermined value is on the at least
one side member.

8. The adjustable bed of claim 6, wherein

the platform is formed from a plurality of surface members supported from underneath by an adjustable stage that
5 oscillates on a fixed stage,

the flex mechanism has an actuator disposed on an underside of the platform and adapted to flex the platform by tilting one or more of the surface members,

the tilt mechanism has a first and a second elevation
10 mechanism capable of elevating both sides of the adjustable stage independently, and

the flex and tilt mechanisms are independently operable.

15 9. The adjustable bed of claim 8 comprising a synchronized operation unit adapted, at an operation time of the first and second elevation mechanisms, to operate the first and second elevation mechanisms in synchronization so as to
20 elevate the platform while maintaining the platform in a horizontal position.

10. The adjustable bed of claim 8, wherein

the platform is a coupled platform formed from the surface members being coupled together,

the flex mechanism drives the actuator, which is disposed on the underside of the coupled platform, to flex the coupled platform,

the first and second elevation mechanisms each include
5 a parallelogram mechanism adapted to elevate sides of the adjustable stage in a perpendicular direction using (i) a plurality of support arms that hang down parallel with one another from the respective side of the adjustable stage so as to extend in line with the side, (ii) a horizontal link
10 arm disposed with respect to the support arms so as to extend in line with a flat surface of the bed, and (iii) a slide groove member disposed horizontally and connected to a lower end of the support arms so as to allow the support arms to travel freely, and

15 the platform surface is tilted by separating one side of the adjustable stage and the respective horizontal link arm using another actuator, to lift the side.

11. The adjustable bed of claim 10, wherein

20 the adjustable stage is (i) disposed on the fixed stage via a roller that rotates in a width direction of the platform, and (ii) has a mechanism adapted to tilt the platform surface while running the roller over the fixed stage when at least one of the parallelogram mechanisms is operated, and

the roller includes a viscosity-generating unit adapted to control the roller to rotate smoothly when running over the fixed stage.

5 12. The adjustable bed of claim 10 comprising:

a slide-roller mechanism disposed on the coupled platform between the adjustable stage and a region corresponding to a foot of the adjustable bed, wherein

the coupled platform and the adjustable stage are
10 prevented from separating when the bed is driven, by a roller disposed on the coupled platform traveling in a slide groove provided in the adjustable stage.

13. The adjustable bed of claim 6, wherein

15 the side members are each formed from (i) a first side member having a slot in a thickness direction, and (ii) a second side member housed in the slot and coupled to the first side member and the platform, and

the tilt mechanism is structured such that the second
20 side member is pulled from the slot in the first side member when the platform surface is tilted.

14. An adjustable bed comprising:

a plurality of airbags laid along a bed surface;

a sidewall lift mechanism adapted to inflate airbags provided on side parts of the bed surface, to form a pair of sidewalls;

a flex mechanism adapted to form a flexion position that
5 includes at least one of a sitting-up position and a knee break, by inflating or deflating an airbag provided on a middle part of the bed surface; and

a tilt mechanism adapted to inflate or deflate airbags provided on the middle and side parts after the sidewall lift
10 mechanism is operated, so as to tilt the bed surface of the middle part toward one of the sidewalls, wherein

the flex and tilt mechanisms are both operable with the other mechanism in an operational state.

15 15. A mattress for use with an adjustable bed as in any of claims 1 to 14, wherein mattress parts whose position corresponds respectively to the platform and the side member are made from a different material.

20 16. A mattress for use with an adjustable bed as in any of claims 1 to 14, wherein a slit is provided at a position corresponding to a boundary between the platform and the side member.

17. A mattress for an adjustable bed as in any of claims 1 to 14, wherein an alignment mark for a bed user to lie on the mattress is formed on a mattress surface.

5 18. A mattress for an adjustable bed as in any of claims 1 to 14, wherein a fixed implement is provided on a mattress surface facing the side member, so as to mate the mattress with the side member when the side-member lift mechanism is driven to raised the side member.

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19. A body-position fitting for use by a bed user of an adjustable bed as in any of claims 1 to 14, comprising a holding unit adapted to hold the bed user in a posture with hands corresponding to an abdominal region of the bed user.

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20. A decubitus-ulcer prevention fitting for use by a bed user of an adjustable bed as in any of claims 1 to 14, comprising a cushioning unit adapted to be interposed between legs of the bed user.

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21. A sequence for adjusting an adjustable bed that includes a platform having a flexible surface, a flex mechanism adapted to flex the platform to form a flexion position which includes at least one of a sitting-up position and a knee

break, a side member disposed on a side of the platform, a side-member lift mechanism adapted to raise the side member relative to the platform surface, and a tilt mechanism adapted to tilt the platform surface laterally, comprising:

5 a first step of operating the flex mechanism;
 a second step of operating the side-member lift mechanism after the first step; and

 a third step of operating the tilt mechanism after the second step.

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22. A sequence for adjusting an adjustable bed that includes a platform having a flexible surface, a flex mechanism adapted to flex the platform to form a flexion position which includes at least one of a sitting-up position and a knee
15 break, a side member disposed on a side of the platform, a side-member lift mechanism adapted to raise the side member relative to the platform surface, and a tilt mechanism adapted to tilt the platform surface laterally, comprising:

 a side-member lift step of raising the side member to
20 a predetermined angle at a drive time of the side-member lift mechanism;

 a tilt step of operating the tilt mechanism after the side-member lift step; and

 a release control step of performing a release control

after the tilt step, by lowering the side member from the predetermined angle to an obtuse angle.

23. A sequence for adjusting an adjustable bed that includes
5 a platform having a flexible surface, a flex mechanism adapted to flex the platform to form a flexion position which includes at least one of a sitting-up position and a knee break, a side member disposed on a side of the platform, a side-member lift mechanism adapted to raise the side member
10 relative to the platform surface, and a tilt mechanism adapted to tilt the platform surface laterally, comprising the step of:

driving the bed while synchronizing (i) a rate of change of an angle at which the platform is tilted by the tilt
15 mechanism relative to a horizontal surface, and (ii) a rate of change of an angle at which the side member is tilted by the side-member lift mechanism relative to the platform.